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# **Brown Bear Studies**

COMPLETION REPORT  
1960-1966

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NORTH TONGASS  
**National Forest**  
JUNEAU, ALASKA



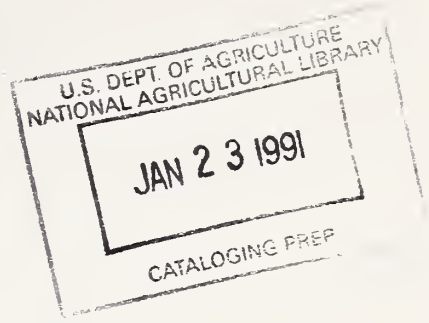
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BROWN BEAR STUDIES 1960-1966 - COMPLETION REPORT

NORTH TONGASS NATIONAL FOREST

JUNEAU, ALASKA

1966

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BROWN BEAR STUDIES 1960-66COMPLETION REPORT

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## BROWN BEAR STUDIES 1960-66

### COMPLETION REPORT

#### ABSTRACT

Effects of logging on brown bear distribution and habitat were studied by the U. S. Forest Service on Admiralty, Baranof, and Chichagof Islands in southeast Alaska, 1960-66. Little or no changes were observed in bear populations as a result of aerial surveys on three shoreline flight transects totaling 390 miles, despite increases in both logging and bear harvest. Aerial surveys also showed that bear were seldom sighted near active logging areas. Litter sizes for the prelogging period compared favorably to litter sizes during active logging. Litter size indices for the prelogging period were 2.2 for cubs of the year and 1.9 for yearling cubs; and during active logging, 2.1 for cubs of the year and 1.6 for yearling cubs. Track counts taken before, during, and after logging indicated no major shift in bear distribution in any of the five study streams except for Rodman River, where the counts during active and post logging conditions were less than for the prelogging period. Decreased counts for Rodman River may have been the result of intensive logging or change in study crews or both. Changes in track indices for the remainder of the study streams were more the result of variations in tracking conditions and availability of fish than it was from logging. Importance of the different habitat types studied could not be accurately determined because of the lack of bear sign, difficulty in assessing bear use, and influence of salmon on actual use of areas by bear. The brief span of only two years of post logging condition showed no major change in vegetation of logged areas. Bear problems at garbage pits was minimal. Harvest of 110 bear in 1966 was highest on record for southeast Alaska. Mean hide size dropped approximately one foot - 14.2 feet in 1961 compared to 13.0 feet in 1966. Admiralty Island continues to yield the greatest harvest of brown bear in southeast Alaska. Illegal kill of bears was not considered high. Nuisance bear lead in this category. It is known that strong opinions exist both for and against the bear. Public attitudes must be understood and considered in managing the bear to minimize controversies pertaining to the relative importance of habitat and other resources.



## BROWN BEAR STUDIES 1960-66

### COMPLETION REPORT

#### INTRODUCTION

The present controversy over the brown bear in southeastern Alaska was influenced to a large degree by pressure groups during the 1930's who favored National Park status for Admiralty Island. The basic motive behind this effort was to lock up the timber resource to preserve the natural habitat of bear. The pros and cons of such motives have been the subject of a long standing controversy. These and other attempts to protect brown bear have gained impetus because of recent increases in logging brown bear habitat in southeastern Alaska, and because of a fear that logging may have an adverse effect upon the bear.

The Forest Service initiated the current brown bear studies to evaluate the effects of logging on bear habitat and to gain a better understanding of brown bear habitat requirements. Because of accelerated logging, results were needed to formulate brown bear-timber management coordination measures to insure the welfare of brown bear populations and bear habitat.

The first of the current studies began in 1958 and was a joint effort between the U. S. Fish and Wildlife Service and U. S. Forest Service. The main objectives of the 1958 study were to determine numbers of, and population trends in the brown bear on Admiralty, Baranof, and Chichagof Islands; to evaluate the effects of logging on brown bear, and to compare results of the present study with bear surveys made in the 1930's. Track count census and aerial survey counts comprised the techniques of the study and provided needed prelogging data. Results of the 1958 work were reported by the U. S. Fish and Wildlife Service under that agency's Federal Aid in Wildlife Restoration, Alaska Brown Bear Studies, Project W-3-R-13, Vol. 13, No. 1, December 1958. Forest Service District personnel performed minor follow-up work in 1959. In 1960 the Forest Service assumed full responsibility for the bear study, and expanded it to include additional areas. Current studies were completed in 1966.

The study areas encompassed the southern half of Admiralty Island, Northern Baranof Island, and adjacent areas in Peril Strait. Locations of various study phases and logging status throughout the study area is shown in Figure 1. Study areas were selected on sites where logging was imminent or underway and where bear were relatively abundant. Field work was done by chief of party, M. M. Perenovich, Jr., and one seasonal assistant. Numerous Ranger District and State Fish and Game personnel assisted in the aerial survey and track count studies.

#### OBJECTIVES

1. Population Densities - To obtain a general index of bear abundance before, during, and after logging in logged and adjacent unlogged areas.





Fig. 1. Map of brown bear study areas showing locations of various study plots and status of logging

Key

- Shoreline Flight Transects
- - - - - Track Census Streams
- ▲ Bear Use Study Plots
- Forest Understory Transects
- Logging Camps
- ▨ Logged Areas

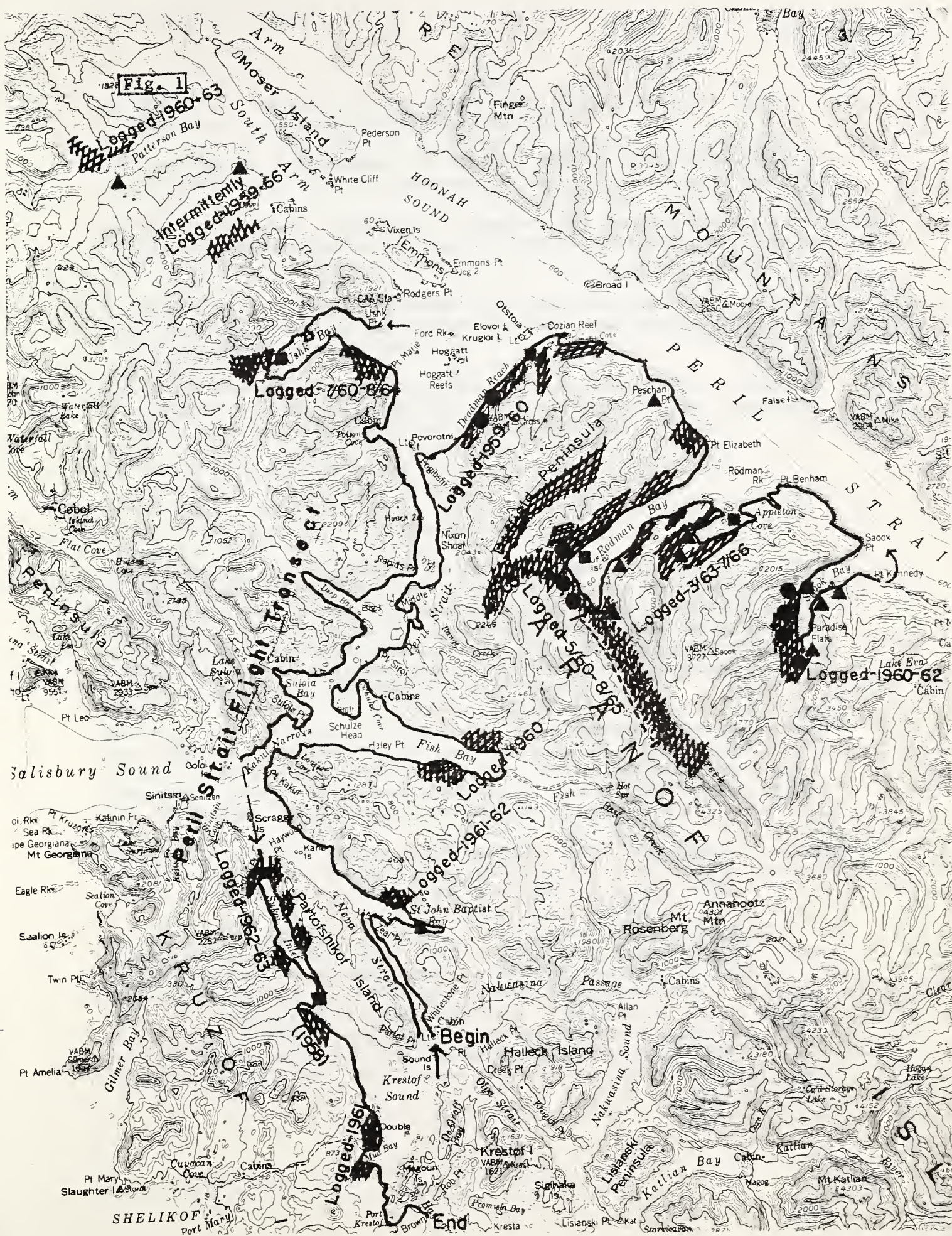


Fig. 1, con'  
Turnabout I













2. Population Distribution - To measure the effects of active logging operations on normal distributions of bear.
3. Bear Habitat Relationship - To identify habitat types used by bear and to evaluate the relative importance of each to the animal's well being.
4. Forest Understory Evaluation - To measure and evaluate changes in forest floor vegetation due to logging and to relate such changes to the welfare of the bear.
5. Bear-Garbage Problem - To assess the relationship between garbage disposal at logging camps and bear problems, and develop recommendations for minimizing the problem.
6. Bear Mortality - To gather information on bear mortality, including legal and illegal kills, and death from other causes, for assessing this factor and its effect upon the population as a whole.
7. Public Attitude - To assess the public attitude toward bear.

#### PROCEDURES

Population Densities. A Cessna 180 with two observers was used for all surveys. Three flights were made on consecutive days when possible during late evening hours (7:00 p.m. to 9:00 p.m.) along selected shorelines. The flying was done from about 500 feet offshore, at an altitude of 300 feet, and at speeds near 100 m.p.h. Flight transects were located on southeast Admiralty Island, southwest Admiralty Island, and along Peril Strait measuring 150, 80, and 160 miles, respectively.

Each bear seen was marked by location on a map and classified as either adult bear, sow with cubs of the year, and sow with yearling cubs. Information on weather, tide, number of hunting parties, fishing boats, and other related observations were recorded for each flight. No attempt was made to separate the different bear sighted between surveys for any given year.

The surveys were made during the second half of May from 1960-63, and again in 1966. In 1963 surveys were rescheduled for every third year. One follow-up flight was also made over each transect in June 1962.

Population Distribution. Selected salmon streams in and adjacent to logging areas were hiked from tidewater to the approximate limits of fish travel upstream. Track measurements were taken enroute. Individual bear were identified by differences between track measurements, tolerances being set according to tracking conditions. Tracks were classed either distinct or indistinct. Distinct tracks were measured within 1/8 inch and indistinct tracks within 1/4 inch. Measurements were taken of the greatest pad width and length of the forefoot, exclusive of middle claw.



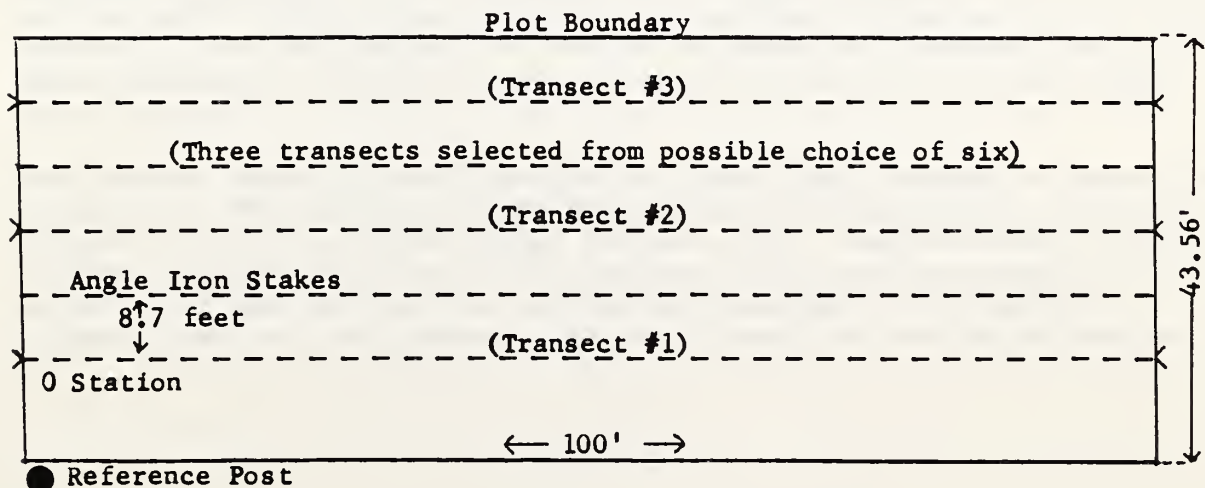
The hindfoot track was also measured when available. Duplicate tracks were considered as separate bear only when tracks were more than a mile apart, and in the judgment of the observer the tracks were made by different bear under conditions of heavy bear use.

Track measurements were made on four important salmon streams of southwestern Admiralty Island, (See Fig. 1) from the south arm of Hood Bay to Wilson Cove and on Rodman Creek on the north shore of Baranof Island. On Admiralty Island, Hood Bay Creek, Chaik Creek, and Wilson Cove Creek were selected as check streams to determine the extent of bear withdrawal from Whitewater Creek, the area being actively logged. Track counts on the streams on southwest Admiralty Island began in 1962 and on Rodman Creek in 1963.

Bear Habitat Relationships. Bear use as indicated by tracks, droppings, trails, and vegetational use was recorded from plots measuring 6.6 feet by 660 feet (1/10 acre). Arbitrary ratings of light, medium, and heavy bear use were recorded. Ratings were largely based on the degree of bear trail use. Accordingly, the majority of plots were established where bear use was believed to be most prevalent. Except for plots in the alpine areas all other plots were situated near the beaches.

Four broad habitat types were studied - climax forest, grassflats, muskegs, and alpine. A total of 27 plots were established - 16 in 1960 and 11 in 1961. Distribution of plots according to habitat types were as follows: seven in forested areas, nine on grassflats, five on muskegs, and six in alpine areas. Plots were read biannually, in 1960-61, in June and again in August, except for the alpine plots which were read in July. Due to the scarcity of sign observed on the June check, no June readings were made during the 1962 and 1963 studies. This study phase was terminated in 1963.

Forest Understory Evaluation. Plots measuring 43.56 feet by 100 feet (1/10 acre) were established in timbered areas where logging was imminent and bear numerous. Measurement of understory vegetation was made on three randomly selected transects within each plot. Selection of transects was made from six possible choices using a spacing interval of 8.7 feet. The diagram below exemplifies a possible transect layout.







A 100-foot tape was positioned over permanent transect markers and a plumb bob moved along the tape. Readings were taken at each foot mark except that actual points of interception for overstory were recorded. Vegetation was recorded by species. The age of Vaccinium sp. was recorded, in addition to bear and deer sign seen on the plot. Two photographs were taken from the zero station of each transect - one a general view and the other a close up view of a 3-foot by 3-foot area.

The number of plots placed in each logging unit varied according to the size of the cutting unit. Two plots were established on sales of 40 acres or less and at least four plots on sales up to 100 acres in size.

Nine plots were established during the summer of 1960, in advance of logging. In 1961 seven plots affected by logging were read, whereas all plots were read in 1962 of which eight were logged and one was unlogged. In 1962, plots were scheduled for reading at 5-year intervals.

Bear-Garbage Problem. Logging camps on or adjacent to the study area were visited during 1960-63 and personal contacts were made with responsible parties at each camp. Inquiries were made to determine whether or not bear-garbage problems or other bear problems existed. An inspection was also made of each garbage disposal site, after which a questionnaire form was completed.

Bear Mortality. Most of the data on bear mortality was obtained from State Fish and Game bear tag returns and from reviews of State Fish and Game and U. S. Fish and Wildlife Service reports. Some information on mortality was also obtained from personal interviews with loggers, and through direct field observations.

Public Attitude. Although formal sampling of public opinion of the brown bear was planned, this feature of the study was abandoned because of the difficulty of meeting Department of Agriculture regulations.

## RESULTS

Population Densities. For this report, the highest numbers of bear counted will be used. Index to bear abundance is expressed as bear per mile. The counts for 1960 and 1966 will be used as the basis for comparing pre-logging and post-logging conditions (peak of logging essentially occurred between these years.)

The greatest number of bears observed for each flight transect is summarized in Table 1. The counts on southeastern Admiralty Island showed a difference of only five bears between 1960 and 1966. The peak count occurred in 1960, declined to a low in 1962, after which it again increased. The index of .21 bear per mile for southeastern Admiralty Island was only slightly less than the greatest index of .26 bear per mile which occurred



Table 1. Greatest number of bear observed on any of three flights for each year of survey.

Flight Transect	Transect Length (mi)	No. of Bear							Bear Index (Bear/Mile)						
		1960	1961	1962	1963	1964	1965	1966	1960	1961	1962	1963	1964	1965	1966
SE Admiralty	150	32	22	15	21	1/	1/	27	.21	.15	.10	.14	1/	1/	.18
SW Admiralty	80	21	10	12	15	1/	1/	13	.26	.13	.15	.19	1/	1/	.16
Peril Strait	160	6	7	5	3	1/	1/	1/	.04	.04	.03	.02	1/	1/	1/

1/ Not surveyed



on southwestern Admiralty Island. Two small scale logging operations were active on the former flight transect. One operation, in Eliza Harbor, has been active since 1954. The other operation was in Chapin Bay where logging began in July 1962 and ended in April 1966.

The high count in 1966 for southwestern Admiralty Island was only slightly above half the high count which occurred in 1960. Logging activities on this transect were limited to one sale in Whitewater Bay which did not become active until August 1962. Thus only the 1963 and 1966 surveys were influenced by logging. Except for some instances, no definite trend in the counts was shown by the Admiralty Island transects. The counts for these transects were highest in 1960, then they dropped sharply in 1961, after which very little similarity in trend was shown. No explanation can be given for the sharp drop in the counts which occurred in 1961 for both Admiralty transects.

The counts made in Peril Strait remained consistently low throughout the survey periods despite this transect being the longest - twice that of southwestern Admiralty. The peak count of seven bear in Peril Strait was extremely low in comparison to other transects - 32 bear for southeastern Admiralty Island and 21 bear for southwestern Admiralty Island.

There was considerably more active logging in Peril Strait. In 1960 there were two areas being logged compared to five in 1963. Between 1960-63 a total of nine logging companies operated in different areas of this flight transect.

An insight into the general well being of bear in the areas surveyed can be ascertained through a review of productivity data contained in Tables 2 and 3. Although a greater sample size would be needed to more accurately reflect productivity as a consequence of the bear's welfare, information to date indicates that productivity is good. As shown in Table 2, not only were litter groups observed on practically every survey, but litter sizes from current surveys compared favorably to litter sizes for the pre-logging period (1958). Average litter sizes (based on 45 samples) during 1960-66 were 2.1 for cubs of the year and 1.6 for yearling cubs, while in 1958 it was 2.2 for cubs of the year and 1.9 for yearling cubs.

Population Distribution. Of the five study streams in which track indices prior to logging in 1958 were compared with indices during and after logging in 1966, only Rodman River showed a consistently lowered track index during and following logging, (Table 4.) Track indices for the remaining streams were the same or in most cases greater than the prelogging index except for the 1966 count in Whitewater Bay. During the period 1960-66, no great differences in track indices existed for either the logged or unlogged streams. The greatest percent of change for a logged stream (Whitewater Bay) was 50% and for an unlogged stream (Hood Bay) 55%. The magnitude of fluctuations in these counts are normal and thus constitute an inherent weakness which must be considered in this type of study. The drastic changes which resulted, therefore, rather than being related to logging were more the result of varying tracking conditions, changes in study crews, and availability of salmon.

In 1966, the track counts were influenced because salmon in Rodman River were not distributed throughout the stream. Normally, many spawning and





Table 2. Summary of aerial survey results by major classes of bear.

Area	Flight	Adult Bear					No. of Cubs					No. of Litters					Total No. of Bears				
		'60	'61	'62	'63	'66	'60	'61	'62	'63	'66	'60	'61	'62	'63	'66	'60	'61	'62	'63	'66
SE Admiralty	1st	17	16	9	11	15	0	2	6	2	7	0	1	3	1	4	17	18	15	13	22
	2nd	11	17	7	13	19	3	0	0	2	8	1	0	0	1	5	14	17	7	15	27
	3rd	23	20	14	16	13	9	2	0	5	2	4	1	0	3	1	32	22	14	21	15
	Follow up	-	-	2/ 8	-	-	-	-	6	-	-	-	-	4	-	-	-	-	14	-	-
SW Admiralty	1st	16	7	10	12	8	5	0	1	3	5	3	0	1	1	3	21	7	13	15	13
	2nd	2/ 2	6	10	8	9	2/ 2	0	2	1	4	2/ 2	0	2	1	2	2/ 2	6	12	9	13
	3rd	13	9	7	7	9	2	1	0	3	2	1	1	0	1	1	15	10	7	10	11
	Follow up	-	-	9	-	-	-	-	0	-	-	-	-	0	-	-	-	-	9	-	-
Peril Strait	1st	5	4	3	2	-	0	0	2	0	-	0	0	1	0	-	5	4	5	2	-
	2nd	6	3	2	2	-	0	2	0	0	-	0	1	0	0	-	6	5	2	2	-
	3rd	3	6	2	3	-	3	1	0	0	-	1	1	0	0	-	6	7	2	3	-
	Follow up	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-

1/ Includes sows with litters.

2/ Incomplete flights due to stormy weather.





Table 3. Composition of individual litter groups.

Area	Sows/ 1 new cub 1960-66	Sows/2 new cubs						Sows/3 new cubs						Sows/1 yearling cub			Sows/2 yearling cubs						Sows/3 yearling cubs					
		60	61	62	63	66		60	61	62	63	66		60	61	62	63	66	60	61	62	63	66	60	61	62	63	66
SE Admiralty	$\frac{1}{1}$	1	2	1	$\frac{2}{3}$	2		$\frac{2}{2}$	0	0	0	0		1	0	2	1	2	1	0	3	1	4	0	0	0	0	0
SW Admiralty	0	0	0	0	0	0		0	0	0	0	0		1	1	3	1	1	$\frac{2}{3}$	0	0	0	3	0	0	0	$\frac{2}{2}$	1
Peril Strait	0	0	0	0	0	-		0	0	0	0	-		0	1	0	0	-	0	1	1	0	-	1	0	0	0	-

1/ Figure is for 1966.

2/ Probability where one duplicate count may exist.



Table 4. Summary of track count results of study streams situated on SW Admiralty Is. and on N. Baranof Is., 1958 & 1962-66.

Stream	FWS Stream No.	Limit of Salmon (Mi.)						Number of Salmon $\bar{1}$ /						Tracking Conditions (G-F-P)						Bear Seen						Number of Individual Bear Tracks						Track Survey Index					
		58	62	63	64	65	66	58	62	63	64	65	66	58	62	63	64	65	66	58	62	63	64	65	66	58	62	63	64	65	66	58	62	63	64	65	66
Hood Bay (Check-stream)	55	3/4	1 1/2	1	1	1	1.5	85	150	1,400	170	870	1,640	P	F	F	P	G	P	2	2	0	1	0	0	2	7	7	6	8	4	4	9	7	7	8	4
Chaik B. (Check-stream)	57	2 1/2	2 1/2	2	2	2	2	4,500	1,000	3,900	970	1,160	2,400	P	F	G	P	G	G	1	2	0	1	3	0	3	8	14	7	9	14	4	10	14	8	12	14
White-water B. (Logging 8/62-5/65)	58	3 1/2	2 1/2	2+	2 1/2	2 1/2	2 1/2	5,000	3,000	3,900	4,100	3,110	2,400	F	P	G	P	G	P	1	8	3	3	2	1	8	2	9	6	9	5	9	10	12	9	11	6
Wilson C. (Check-stream)	60	4	3	3 1/2	3	1 1/2	2.5	450	700	5,500	1,890	1,050	2,500	P	F	G	F	G	G	0	1	3	4	0	0	5	7	5	3	7	3	8	8	9	7	7	
Rodman Cr. (Logging 5/60-8/65)	33	2 1/4	-	5	5	5	1.5	30,000	1	20,000	6,000	13,000	20,000	2 1/2	F	-	G	F	G	0	-	0	2	2	0	26	-	16	15	18	15	26	-	16	17	20	15

Data source for 1958: Fish and Wildlife Fed. Aid Report Vol. 13, No. 1, Dec. 13, 1958.

1/ Includes only live fish seen along streams at time of surveys.

2/ Surveyed August, 1959. Data Source: U.S. Forest Service memorandum, file 2620 date Nov. 13, 1959.

Note: Surveys throughout the study period were made between the following dates:

Hood Bay - August 7-14

Chaik Bay - August 8-14

Whitewater Bay - August 9-13

Wilson Cove - August 11-14

Rodman Creek - August 15-24



spawned out fish were seen along the entire 5-mile survey route. In 1966 very few salmon were seen beyond the first mile and one half of the stream. This change from the normal distribution pattern undoubtedly accounted for the lowered track count. Also in 1966, poor tracking conditions caused by heavy rains just prior to the surveys in Hood Bay and Whitewater Bay accounted for the lowered track counts on these streams.

Bear Habitat Relationship. The amount of bear use recorded within the various vegetative types could not be accurately used as an indicator of the true-bear habitat relationship. As indicated under remarks in summary of bear use ratings, Table 5, the main reasons were: (1) the inability of most cover types to show sign readily to permit identification of individual bear, (2) the attraction of bear to fish gave false indications of actual habitat use, and (3) plots were of insufficient size. As a result of these factors, only an arbitrary use rating could be designated.

Percentage values for different use ratings assigned to all plots are shown in Table 6. The scarcity of sign is readily apparent by the preponderance of light use ratings. In most cases, light use percentages were nearly double and in some cases, greater, than the next higher, or moderate rating. Only one plot showed consistent heavy use which resulted from extensive bear use in a nearby stream where fish were always plentiful.

Forest Understory Evaluation. The most recent measurement of the vegetation plots was in 1962 at which time 5-year interval readings were recommended, thus, information on hand, spans only two years of post logging conditions. Since this phase will require long-term studies before the pattern of vegetation change can be established, analysis of information on hand will not be attempted at this stage of the study.

Results of transect measurements for 1960-62 are shown for individual plots in Figure 2 and a summary of all plot measurements is contained in Figure 3, Appendix.

Bear-Garbage Problem. The attraction of bear to garbage sites was minimal because of proper maintenance of the sites. In some instances, as where floating camps were used, refuse was unavailable to bear because it was disposed of in the bays.

Of the nine camps visited during the formal phase of this study, two operators reported bear seldom visited the garbage pits and seven indicated no bear visits (Table 7). The open pit method of disposal was used by six operators. Three operators discharged all but flammable materials into the bay.

Nearly all operators reported seeing bear at various locations about their camps, but only occasionally did the bear cause any damage or become a nuisance.

The number of bear killed at camps for legal, nuisance, self-defense, or other reasons is reported under bear mortality.





Table 5. Summary of bear use ratings assigned to habitat evaluation study plots, 1960-63.

Plot Number and Location	Habitat Type	Rating	Remarks
B-1 Hood Bay	Forest	M-M-L-M <u>1/</u>	Bear use influenced largely by salmon in nearby stream.
B-2 Chaik Bay	Forest	M-M-L-L	Bear droppings in clustered groups of 4 to 6, 1960 & 1961.
B-3 Chaik Bay	Gr. flat	Light	Several bear and deer seen near plot. Salmon stream (intertidal zone) nearby.
B-4 Whitewater B.	Forest	Light	Logging active since August 1962.
B-5 Wilson Cove	Forest	Light	Old game trail traverses plot.
B-6 Wilson Cove	Gr. flat	L-L-L-M	Bear working on salmon in nearby stream.
B-7 Hanus Bay	Forest	Light	Bear sign light throughout immediate area.
B-8 Saook Bay	Gr. flat	Light	Area logged August 1960 to September 1962.
B-9 Saook Bay	Forest	Light	As above.
B-10 Rodman Bay	Forest	Light	Under extensive logging since May 1960.
B-11 Appleton C.	Gr. flat	M-M-M-L	Logging began spring 1963. Bear working on salmon in nearby stream.
B-12 Fick Cove	Gr. flat	M-M-L	Salmon stream nearby. Fish runs very poor.
B-13 Patterson B.	Gr. flat	Light	Intermittently logged during past 10 years.
B-14 Peschani Pt.	Gr. flat	Light	Nice stream nearby, but few fish seen. Deer sign very common.
B-15 Whitewater B.	Gr. flat	Light	Logging active since August 1962.
B-16 Saook Bay	Gr. flat	Heavy	Only plot with heavy use. Plot near excellent salmon stream. Logging active Aug. 1960 to Sept. 1962.
B-17 Yellow Bear Mountain <u>2/</u>	Alpine	M-M-L	Ground cover limits ability to see sign. Vegetation lush throughout.



B-18 Yellow Bear Mountain	Alpine	M-M-L	As above.
B-19 Middle Mount.	Alpine	M-M-L	As above.
B-20 Middle Mount.	Alpine	M-L-L	As above.
B-21 Soapberry Mountain	Alpine	L-L-L	As above.
B-22 N. Soapberry Mountain	Alpine	L-L-L	As above.
B-23 Chaik Bay	Muskeg	L-L-L	Ground cover limits ability to see sign. Old game trail traverses plot.
B-24 Whitewater B.	Muskeg	L-L-L	As above.
B-25 Rodman Bay	Muskeg	L-L-L	Surrounding area logged in 1960.
B-26 Rodman Bay	Muskeg	L-L-L	As above.
B-27 Appleton C.	Muskeg	M-L-L	Old game trail traverses plot.

1/ Each letter represents rating for each of the years 1960-63. Use is designated as:  
L-light, M-moderate, and H-heavy.

2/ Plots 17 through 27 were established in 1961.



Table 6. Percentage values for different intensity of bear use rating assigned to all study plots for 1960-63.

Intensity of Bear Use Rating (percent)	Year			
	1960	1961	1962	1963
Light	69	63	82	88
Moderate	25	34	15	8
Heavy	6	3	3	4

Bear Mortality. The harvest of 110 bear in southeastern Alaska for 1966 represented the greatest kill on record for this area. As shown in Figure 4, Admiralty, Baranof, and Chichagof Islands have consistently contributed the majority of bear to the southeastern Alaska Harvest. Admiralty Island remains the foremost producer, accounting for 63% of the 1966 harvest from this island group, Figure 5. Southeastern Alaska is represented by game management units one through five, and includes all the islands, the mainland from Ketchikan to Skagway, and the Yakutat area.

Information on hide size and sex of bear, and resident status of hunters for the 1961-66 harvest is summarized in Table 8. Average hide sizes have remained relatively stable in southeastern Alaska, which indicates that bear are plentiful. Male bear, as usual, predominated the harvest because of regulations protecting female bear with cubs. Males comprised 64% of the 1966 harvest.

The trend toward increased harvest by resident hunters was reversed in 1966, when non-residents accounted for 64% of the kill as compared to 36% for residents. Admiralty Island is especially popular with non-resident hunters. The number of bear taken by loggers, or from logging areas has been comparatively low.

Bear harvested during each of the spring and fall hunting periods were nearly equal. May was the most popular month for spring hunting and September for fall hunting.





Table 7. Results of formal inquiries on bear-garbage problem conducted during 1960-62.

Name of Camp	Location	Number of Persons Employed	Method of Disposal	Distance From Camp	Do Bear Visit Garbage Sites?			Have Any Bear Been Shot?		How Long Camp in Operation	Existing Problems
					N <sup>1</sup>	S	F	Yes	No		
Carlson Bros.	Glass Pen. (Seymour C.)	2	Dumped in bay Inflammables burned	200 ft.	X			X		Since 1955	Adult bear frequently seen around camp (1962)
Clear Creek Logging Co.	Rodman Bay	65 (Avg.)	Open pit	1/2 mile		X			X	Since May 1960	None
Ed Hamilton Logging Co.	Eliza Hbr.	4 (Avg.)	Dumped in bay Inflammables burned	On floats	X			X		Since 1954	None
Island Log. Company	Rodman Bay	14	Dumped in bay	On floats	X				X	Since June 1962	None
Nelson Log. Company	Patterson B.	3	Open pit	200 ft.	X			X		June 1960 to Sept. 1962	None
Southeastern Logging Co.	Chapin Bay	3	Open pit	100 ft.	X				X	Since July 1962	None
Tongard Log. Company	Saook Bay	18 -25 (Avg.)	Open pit	100 ft.	X				X	Aug. 1960 to Aug. 1962	Bear reported to occasionally chew on enuirment
Westfall Log. Company	Ushk Bay	5 (Avg.)	Open pit	100 ft.		X			X	Since June 1961	None
Whitewater B. Logging Co.	Whitewater Bay	30 (Avg.)	Used on Roadbed	500 ft.	X				X	Since Aug. 1962	None

1/ N-Never, S-Seldom, F-Frequently.



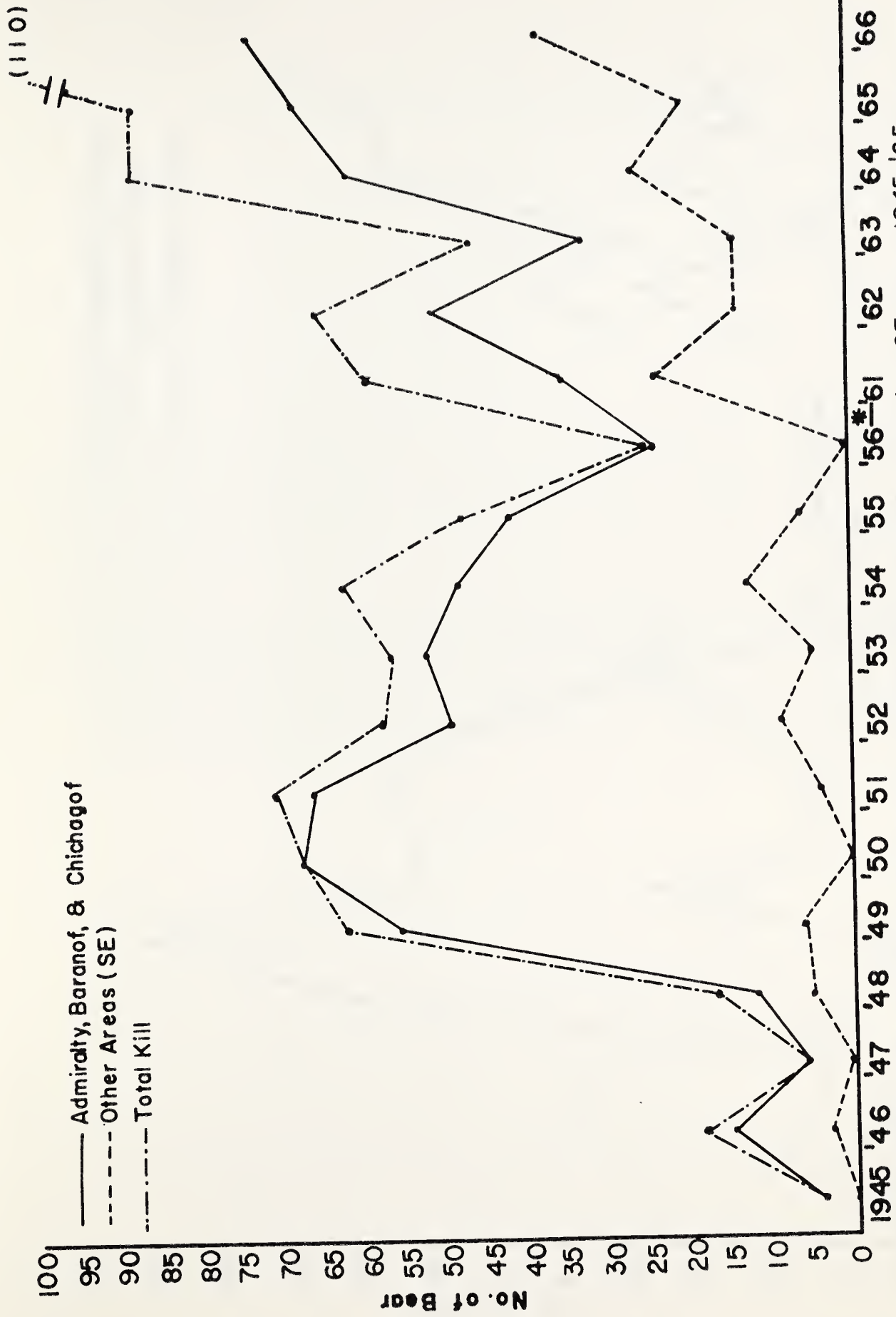


Fig 6- Comparison of Admiralty, Baranof, & Chichagof bear harvest to other SE areas, 1945-'65.

Harvest represents game units 1, 4, & 5 in Southeastern Alaska.

\* Data incomplete for 1957-'60. Bear hide sealing program became compulsory in 1961.





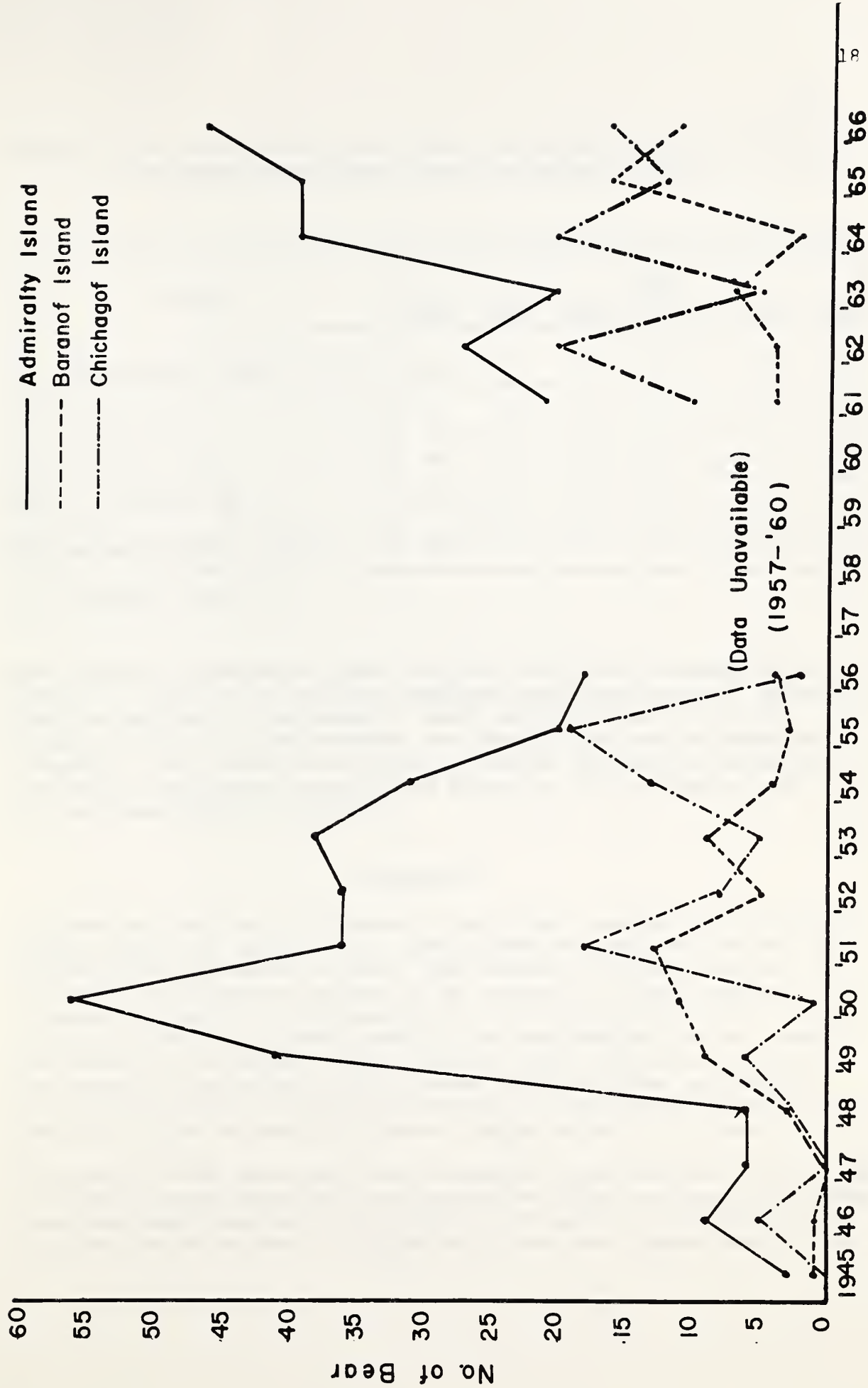


Fig. 5 - Harvest of brown bear on Admiralty, Baranof, & Chichagof Islands for the years 1945-'66



Table 8. Average hide size, sex of bear, and resident status of hunters for southeastern Alaska brown bear harvest, 1961-66.

Category	Years					
	1961	1962	1963	1964	1965	1966
Average Hide Size (L/W) (In Ft.)	14.2	14.4	13.7	13.8	13.9	13.0
Male Bear (In %)	70	70	63	70	72	64
Female Bear (In %)	30	30	37	30	28	36
Resident Hunters (In %)	40 <u>1/</u>	43	48	64	57	36
Non-Resident Hunters (In %)	60 <u>1/</u>	57	52	36	43	64

1/ Estimated from trend.

Bear mortality information (other than the legal kill) is summarized in Table 9. A total of 14 bear were tabulated under this category. Nuisance bear led the list. Other causes of death were attributed to unknown causes, illegal kill, self-defense, and drowning, in order of lessening frequency. Only those bear reported or found on the study areas and in the vicinity of logging camps visited during the 1960-62 bear-garbage survey were considered in this study.

#### DISCUSSION

Although the bear counts fluctuated rather widely (especially the Admiralty Island counts) the spread is not alarming when one considers the host of factors which influenced the data. The presence of hunting parties, fishing boats, and logging activities in the vicinity of flight transects, influenced bear counts by frightening bear from exposed shorelines. Although beyond our control, different survey pilots were assigned and as a result the quality of the surveys varied. Despite these influences, the peak bear count on the Admiralty Island survey in 1966 differed only slightly from the 1960 counts. During this interval not only did the harvest from Admiralty Island increase by 25 bears; logging activities increased as well.

According to track count and other information, bear densities were believed to be nearly equal during the study period for all survey areas, even though fewer bear were observed in Peril Strait. The latter is believed to have resulted from an increase in logging activities; nine loggers operated in



Table 9. Summary of miscellaneous bear kill information (other than legal kill) collected throughout the study period, 1960-66.

Date	Area	Cause of Death	No. and age of bear	Source of Information
May 1961	Chaik Bay	Drowning?	(1) new cub	Project Leader
Summer 1961	Pleasant B.	Illegal?	(1) adult	State F&G Weir Crew
Summer 1961	Peril Strait	Unknown	(1) adult	Forest Service engineers
Summer 1961	Saook Bay	Unknown	(1) adult	Forest Service engineers
May 1962	Peschani Pt.	Illegal kill	(1) adult	Project Leader
Summer 1962	Glass Pen.	Nuisance bear	(1) adult	F.S. Sales Administrator
August 1963	Whitewater B.	Nuisance bear	(1) adult	Camp Supervisor
June 1964	Whitewater B.	Self Defense	(1) adult	District Ranger
October 1964	Rodman Bay	Nuisance bear	(1) adult	F.S. Sales Administrator
October 1964	Whitewater B.	Unknown	(1) age unknown	F.S. Sales Administrator
July 1965	Whitewater B.	Unknown	(1) cub	F.S. Sales Administrator
Summer 1965	Rodman B.	Nuisance bear	(1) adult	F.S. Sales Administrator
Spring 1966	Whitewater B.	Nuisance bear	(1) adult	State Fish & Game
Spring 1966	Whitewater B.	Nuisance bear	(1) adult	Logger





Peril Strait as compared with two operators on southeastern Admiralty Island and one operator on southwestern Admiralty Island. Such intense activities forced many bear to feed along the more restricted shorelines where observation was more difficult. Also, generally colder weather associated with more snow inland prevailed at Peril Strait. This may have set back the peak of bear emergence from hibernation to a period later than the survey periods. More intensive follow-up flights should have been made over this transect.

Generally, the variability of track indices was more the result of varying tracking conditions or availability of fish than logging. No changes in track indices for any of the study streams could be directly related to changes in logging status, except possibly for Rodman River.

The 1958 track survey was made jointly by U.S. Fish and Wildlife Service and Forest Service study crews, Rodman River was surveyed in 1959 by ranger district personnel. Since 1960, all surveys were made by the Forest Service under the same project leader. The change in study crews may have attributed to variations in some counts. We believe this to be especially true in Rodman River.

The ability of bears to tolerate human activities can be better understood with a brief examination of the extent of logging activities adjacent to two study streams, one in Whitewater Bay, the other, Rodman River. The total acreage logged in Whitewater Bay was about 1,030 acres and 1,400 acres in the Rodman River watershed. Logging was intensive, (high-lead method) and occurred on both sides of each of these streams from salt water to approximately four miles upstream for Whitewater Creek and six miles for Rodman River. Total road network used extensively by logging trucks, was six and nine miles, for Whitewater Creek and Rodman River respectively. The roads were parallel and within an average distance of 500 feet of each stream. Each stream had four bridge crossings up to the point where track surveys ended.

There are no indications that brown bear in southeastern Alaska are presently being overharvested. Kill records dating back to 1945 show no appreciable decline in harvest. Major fluctuations in the harvest were mainly the result of country-wide economic conditions rather than numbers of bear available. Despite significant increases in the bear harvest, only a slight drop in hide size was noted. Average size of hides for which data is available ranged from 15.1 feet for 1946-52, to 14.1 feet in 1961 and 13.0 feet in 1966. The decline in hide size does not necessarily indicate a scarcity of trophy-sized bear. A check of tag returns showed that the proportion of bear hides 15.0 feet and over remains about the same. Average hide sizes would have a natural tendency to drop as more bear are being taken.



Bear mortality, other than the legal kill, is difficult to assess because evidence is usually lacking. Our information indicates that nuisance bear lead the list in this category. Conflicts with bear will undoubtedly increase as human activities continue to encroach upon areas inhabited by bear.

Despite the lack of information from a formal sampling of public opinion, it must be recognized that strong feelings do exist for and against the bear. One side strives to preserve natural bear areas for hunting and other sporting purposes, while another favors removal of bear, contending they are a menace to recreationists and deter development. Such extremes of public attitude will undoubtedly continue to exist and will, therefore, have a great influence in the management of brown bear. Although the establishment of policy matters lies beyond the scope of this report, it is important that the various public attitudes be understood and viewed in their proper perspective in the development of resource management programs.

Because of the lack of manpower, the Alaska Department of Fish and Game was unable to participate more actively in this study. They are, however, becoming more involved and concerned with brown bear in southeast Alaska. Tentatively, they have selected the Kadashan Watershed on Chichagof Island as a study area. Their initial efforts will entail collection of life history information in addition to determining the effects of logging on brown bear.

#### CONCLUSIONS

1. Results of aerial surveys spanning a 6-year period showed no appreciable change in bear population levels despite increased logging and higher annual bear harvests. Long term trends of 10 years or more will be more meaningful.
2. Aerial surveys showed that bear were seldom seen on grass flats adjacent to active logging areas, whereas, they were relatively abundant on the flats prior to logging.
3. Litter sizes for the periods of prelogging (1958) and active logging (1960-66) compared favorably. Average litter size under prelogging conditions was 2.2 for cubs of the year and 1.9 for yearling cubs; under active logging conditions, 2.1 for cubs of the year and 1.6 for yearling cubs.
4. Track counts taken before, during, and after logging indicated no major shift in bear distribution that could be directly related to logging in any of the study streams. The decreased counts in Rodman River may have been the result of intensive logging, or change in study crews or both.
5. Tracking conditions and availability of fish affected track counts more than logging.
6. The importance of the different habitat types could not be accurately evaluated because of the lack of bear sign, difficulty in determining bear use, influence of salmon on actual bear use, and small size of the study plots.
7. Information on hand for evaluating the effects of logging on forest understory spans only two years of post-logging conditions. No major change in





vegetation pattern two years after logging was observed. Long-term studies are needed before the pattern of vegetation change can be established.

8. Bear use at garbage pits was minimal due to proper upkeep resulting from frequent covering of refuse.

9. The harvest of 110 bear in 1966 was highest on record for southeast Alaska. Mean hide size dropped approximately one foot - 14.2 feet in 1961 compared to 13.0 feet in 1966.

10. Admiralty Island continues to be the greatest single producer of brown bear to the southeast Alaska harvest.

11. Bear kill, illegal and other, was not considered high. Nuisance bear lead in this category. Such mortality can be expected to increase as human activities continue to encroach upon areas inhabited by bear.

12. It is known that strong opinions favoring and disfavoring the bear exist. Public attitudes must be carefully considered in managing the bear.

#### RECOMMENDATIONS

1. Revise the study to continue phases requiring long-term evaluation. These include the Admiralty Island aerial surveys and the vegetative transect studies. Submit periodic reports as information is collected on each phase of the study.

2. Continue aerial surveys of the Admiralty Island flight transects every three years. The next survey will be in 1969.

3. Continue readings of vegetation transects on logged areas at five-year intervals. Plots are to be read in 1967 and again in 1972.

4. Cooperate with the Alaska Department of Fish and Game in their brown bear investigations encompassing southeast Alaska. Both agencies would stand to benefit by working jointly on such a program.

5. The following measures are recommended to resource managers to insure the welfare of the brown bear. They are based almost entirely on the results of this study and on the experience gained from many individuals contacted during the course of these studies. To insure coordination they should be appended to Ranger District Multiple Use and resource plans as management coordination measures.

a. Aerial surveys indicated bear rely heavily on food from sedge flats in the spring. Effective timber sales planning should provide a minimum of 500 feet of timbered beach fringe surrounding major grass flat areas to provide escape cover and a place for bear to bed down.

b. Avoid random operation of machinery on tidal flats which results in destruction of valuable food plants. Locate camps and rafting areas away from tidal flats or restrict uses to one edge.

c. Locate logging camps or other buildings as far as practical from salmon streams to minimize conflicts with bear.



d. As part of each timber sale inspection include information on bear problems. Report evidence of nuisance bear and illegal kills, to the Alaska Department of Fish and Game.

e. Require all garbage pits to be situated a safe distance, at least one-half mile where practical from camp. Assure proper maintenance of pits by making frequent inspections to see that refuse is being properly covered. Explain the necessity for proper development and maintenance of garbage dumps to logging operators.

f. Keep local fish and game agents advised of the locations of new logging operations so that items pertaining to game regulations can be distributed and discussed. Public relations can be improved immensely through such contacts.



## APPENDIX I

BROWN BEAR STUDIES 1960-66COMPLETION REPORT

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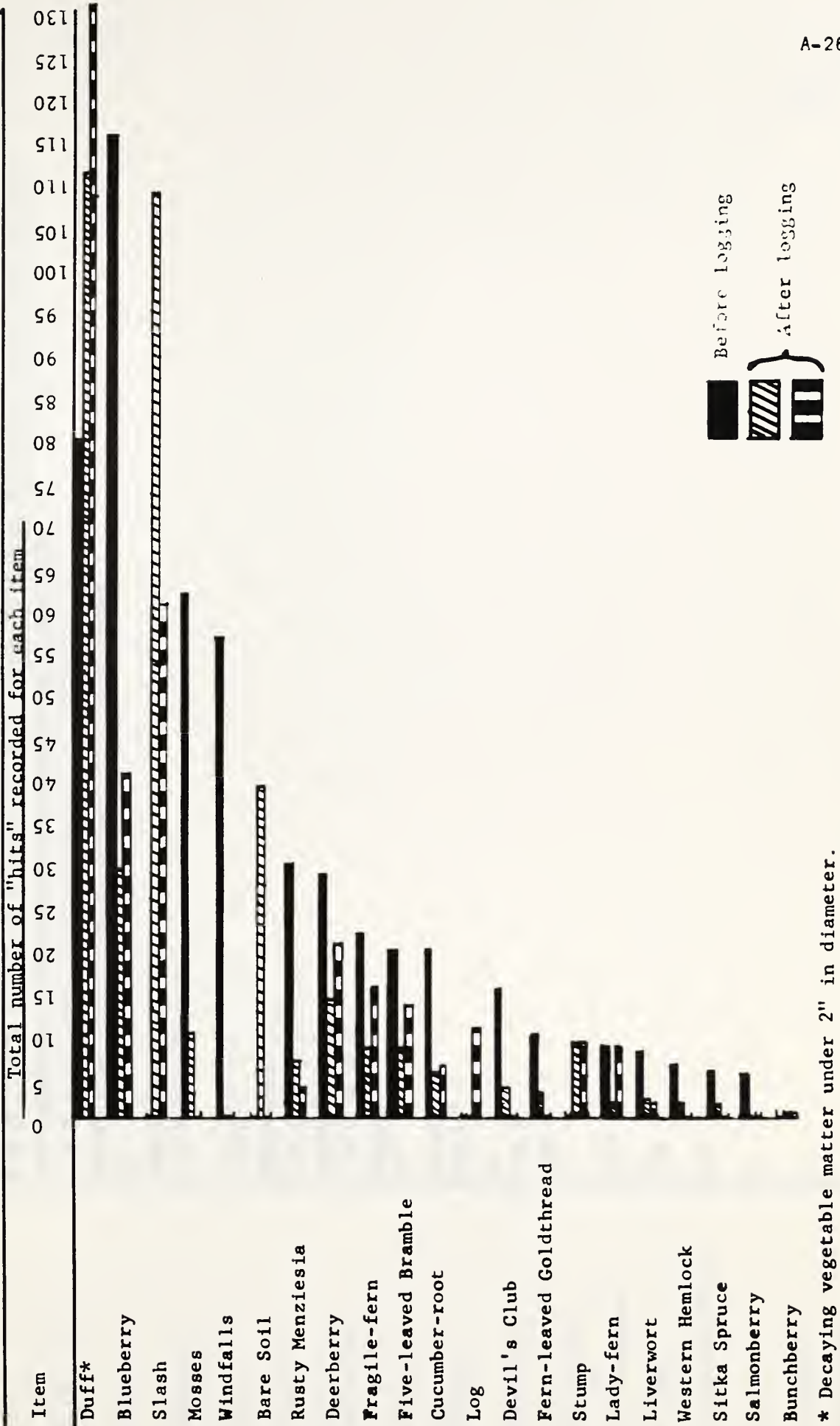
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Figure 2. Tabulation of Plants and Ground Cover Types for Each Vegetation Study Plot . . . . .	A-26
Figure 3. Summary of Plants and Ground Cover Types for All Vegetation Study Plots . . . . .	A-35
List of Common and Scientific Names of Plants . . . . .	A-36
Literature References . . . . .	A-38





Figure 2 -Tabulation of plants and ground cover types showing frequency of occurrence of items for each vegetation study plot established on prelogged areas during 1960 and reread in 1961 and 1962 after logging, Northern Baranof Is.

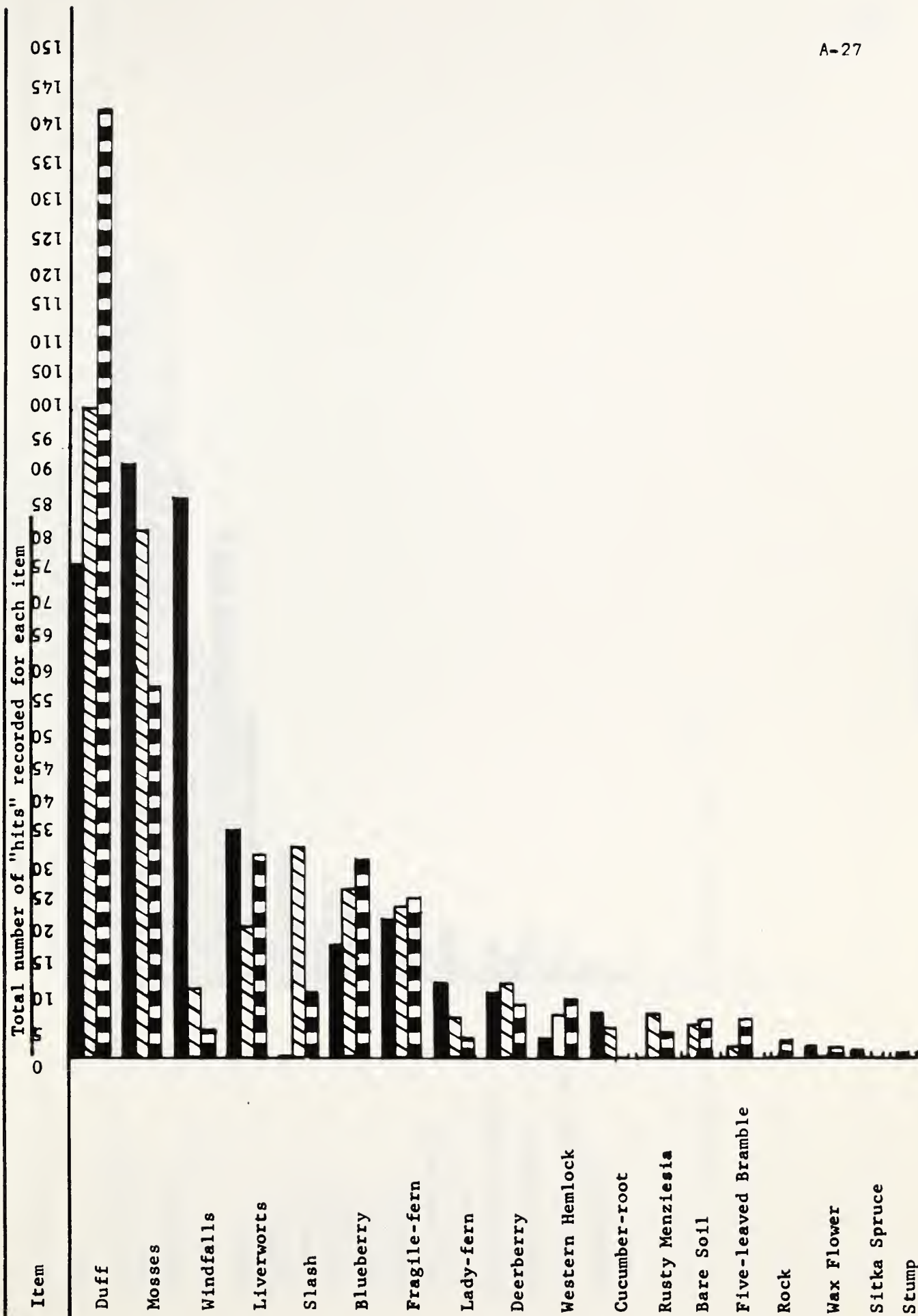
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Key: 1960 1961 1962



PLOT NO. 2 TRANSECTS 1 - 3 (Saook Bay)

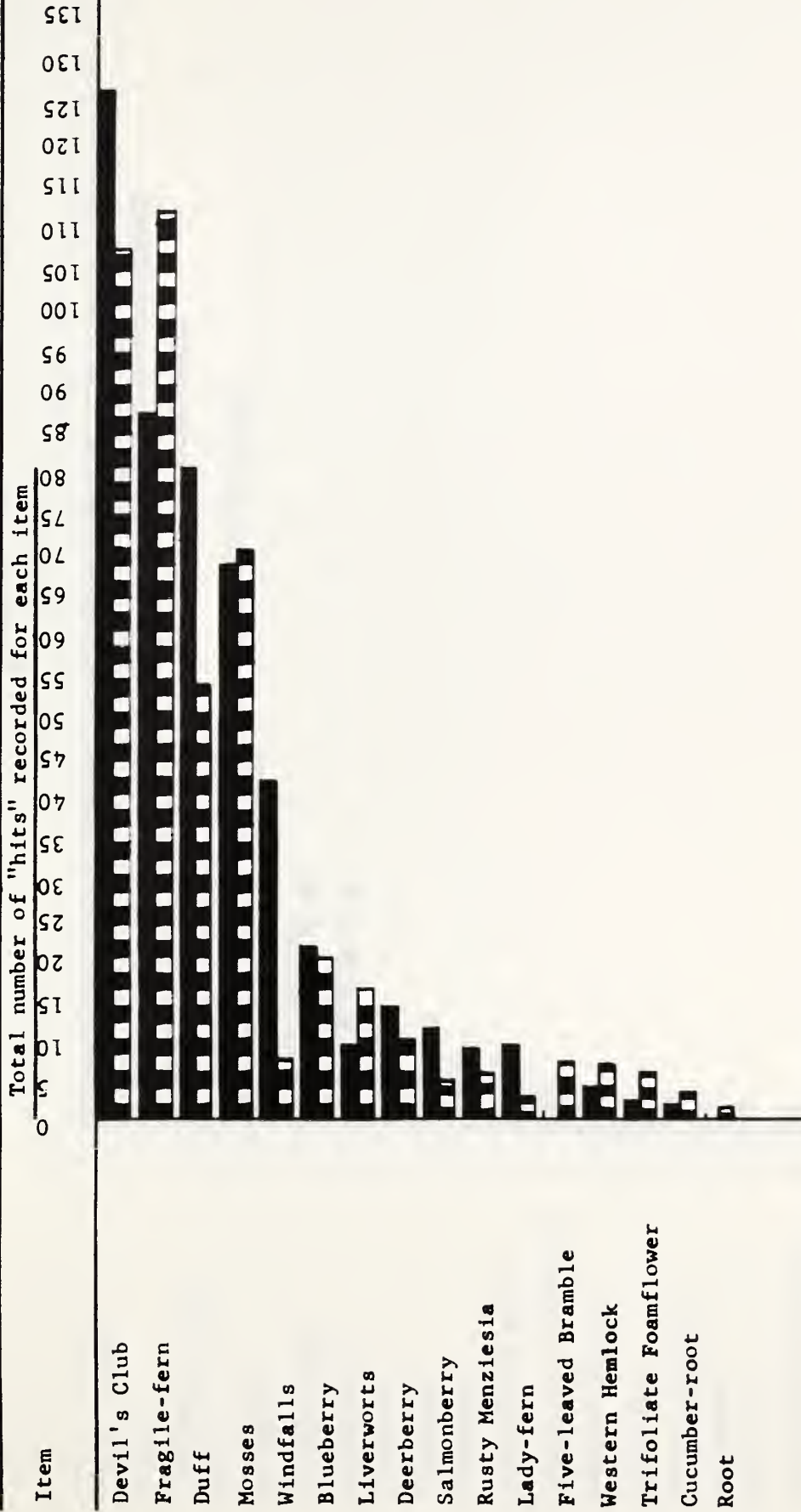


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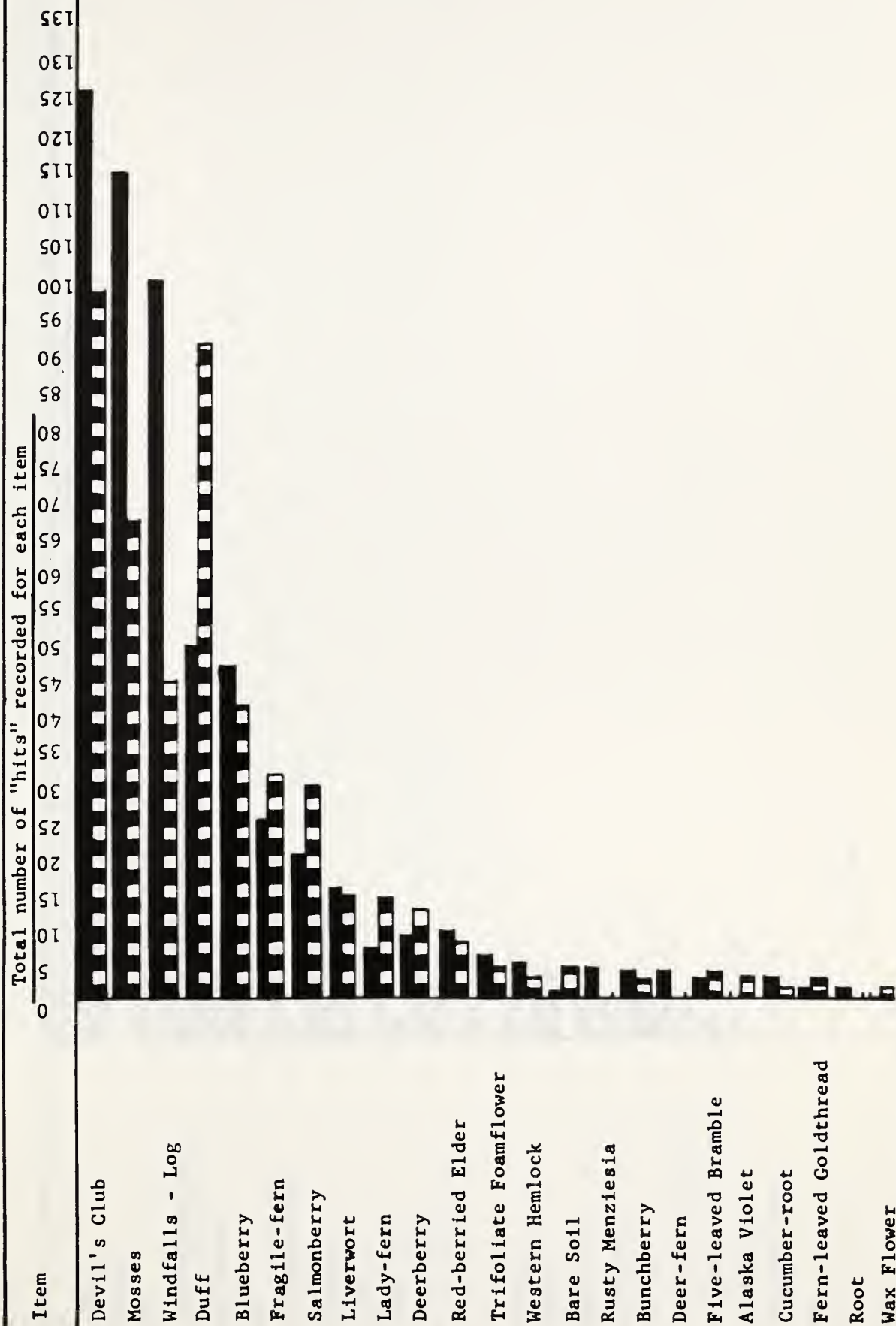


\*\* Plot on unlogged area. Transects not read in 1961.

(continued)



PLOT NO. 4 TRANSECTS 1 - 3 \*\* (Rodman Bay)

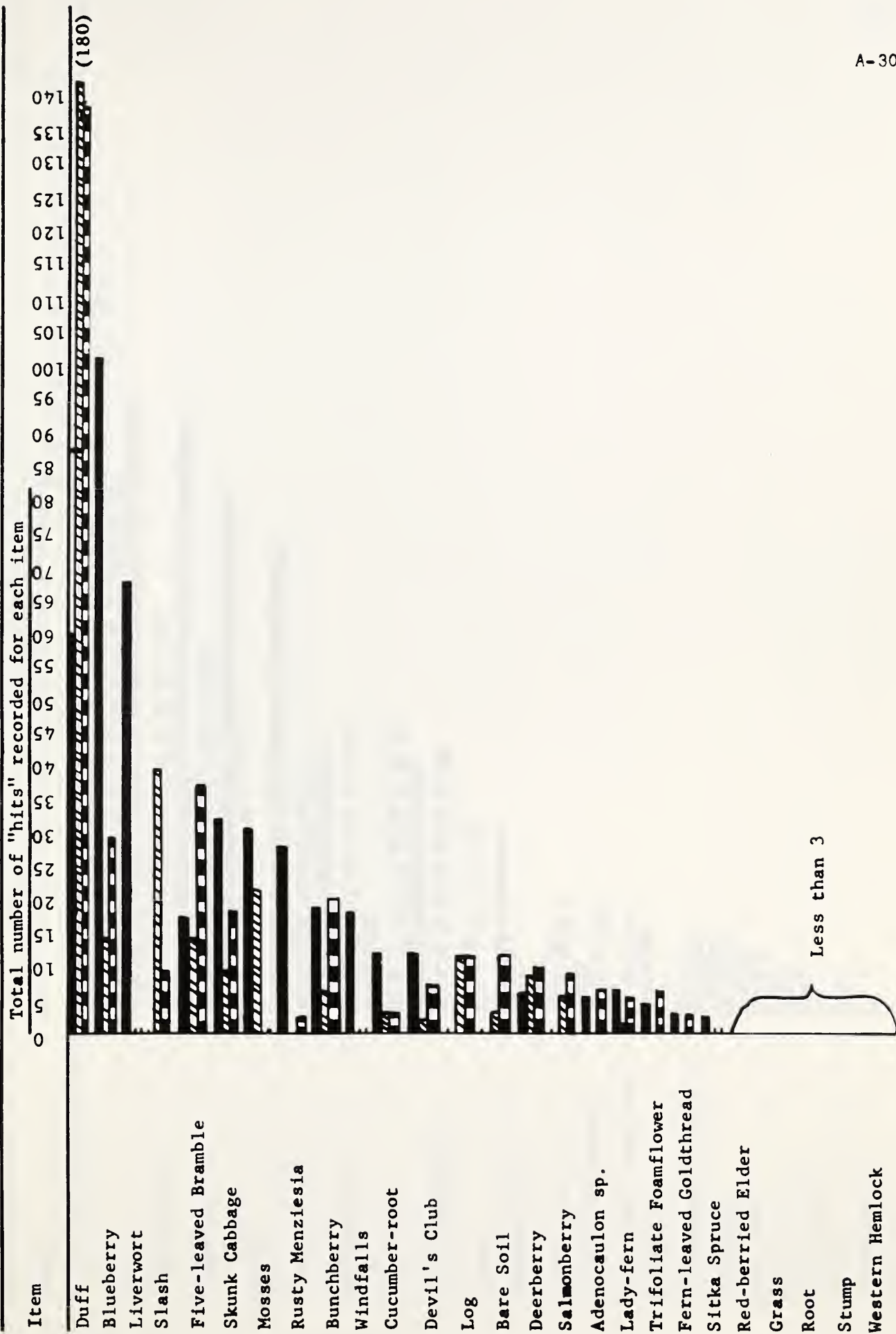


\*\* Plot on unlogged area. Transects not read in 1961.

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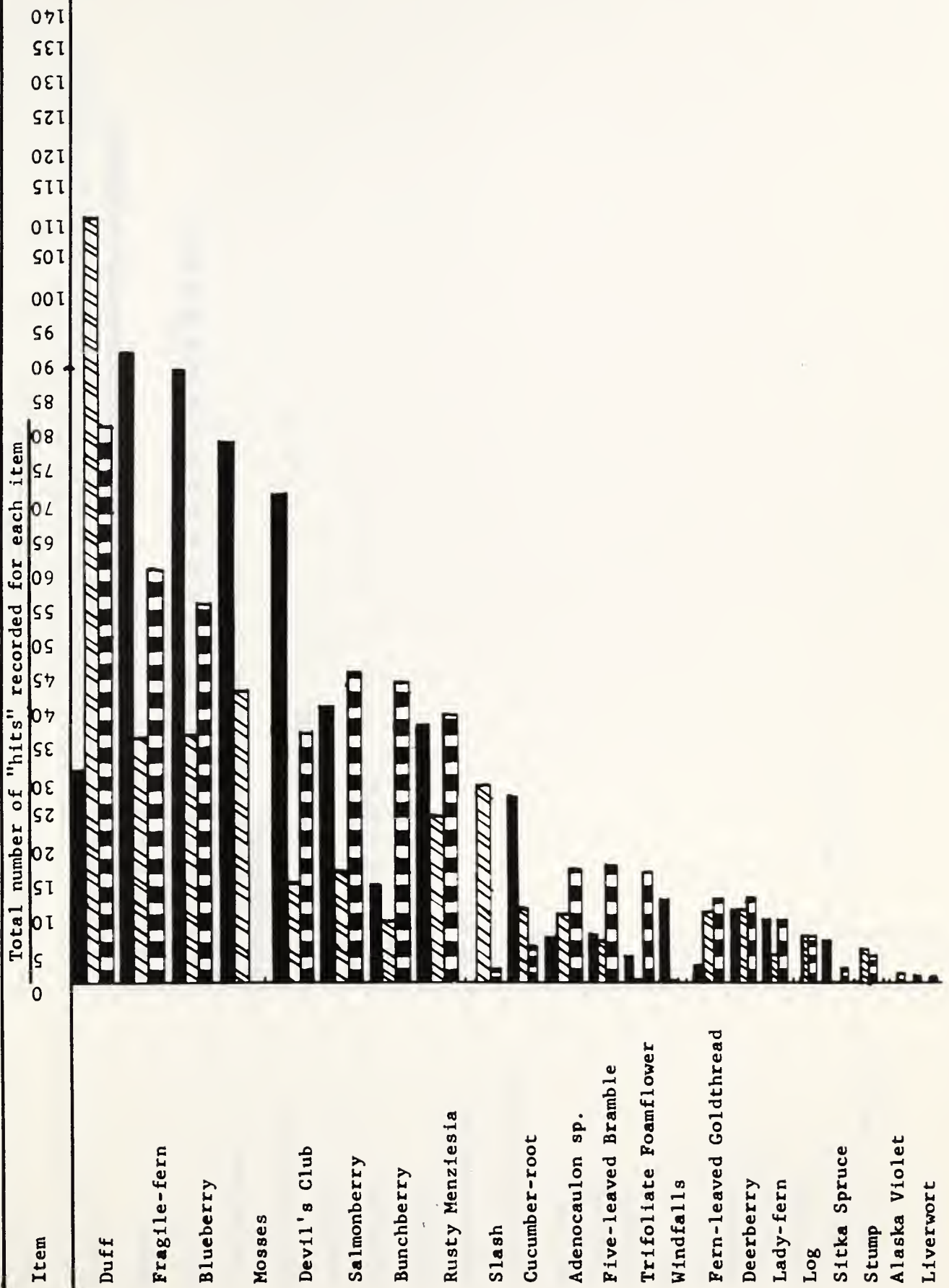
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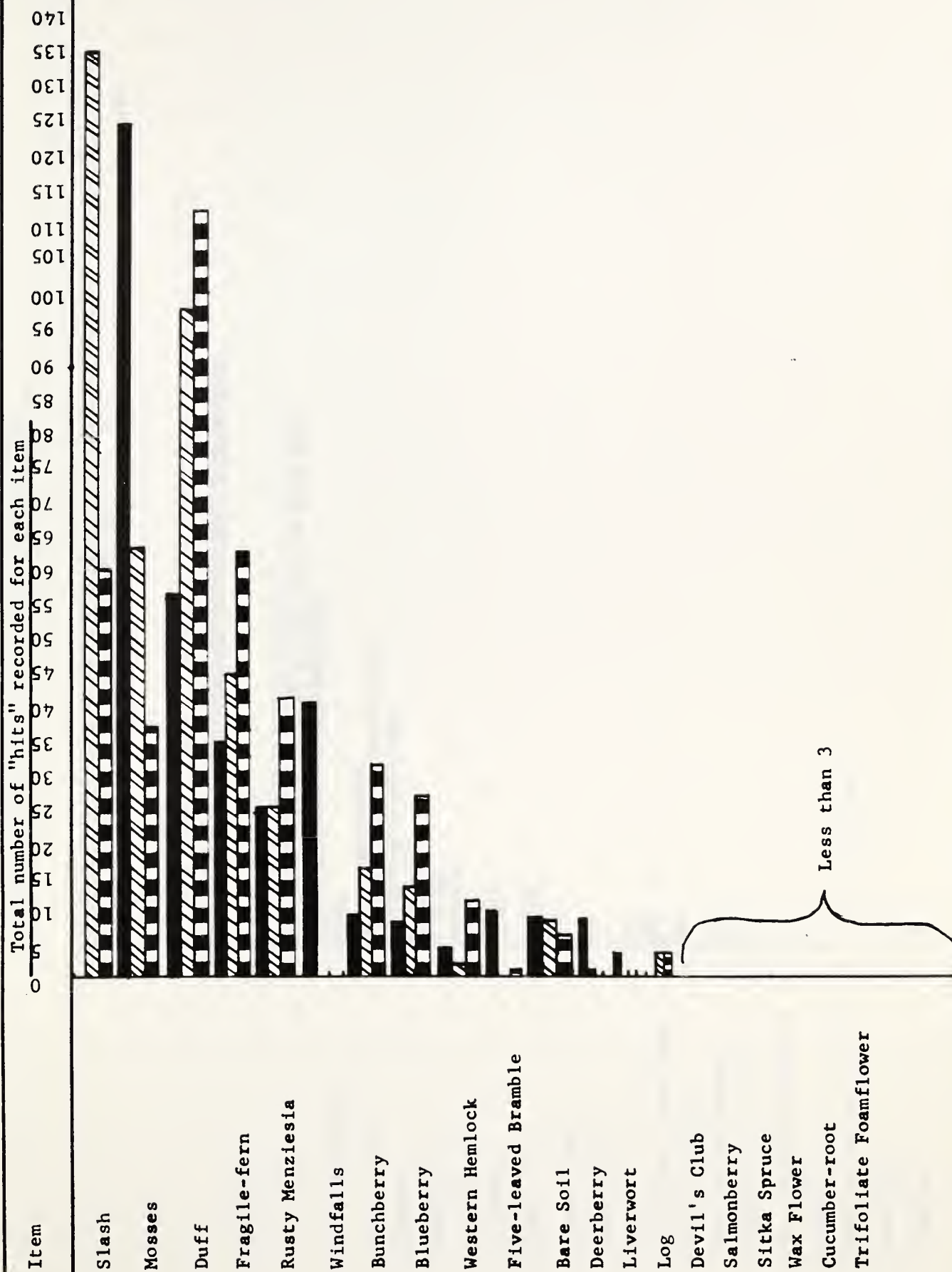
PLOT NO. 6 TRANSECTS 1 - 3 (Rodman Bay)



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PLOT NO. 7 TRANSECTS 1 - 3 (Deadman Reach-Peril Strait)

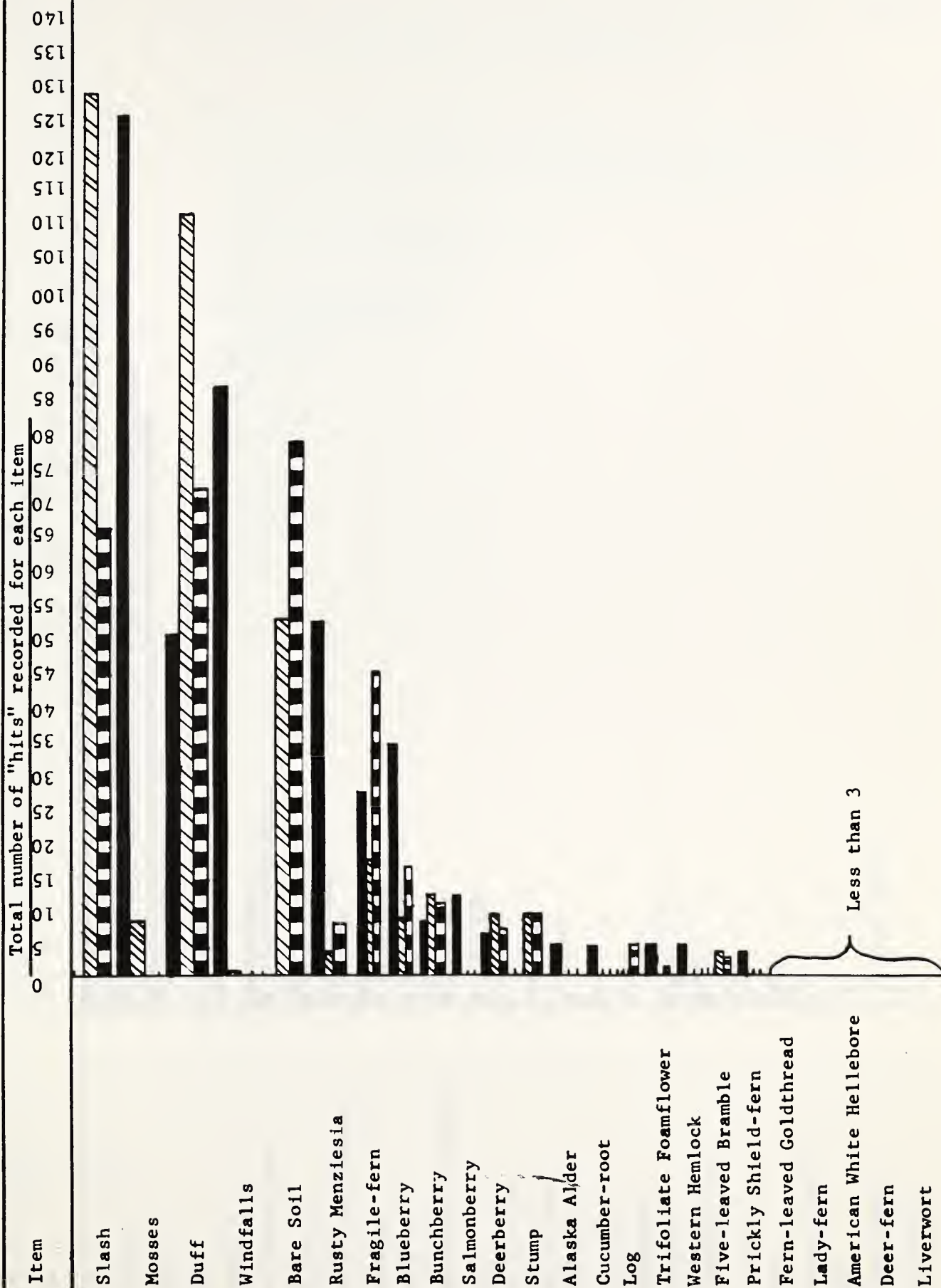


Note: Reference and plot markers 7 through 9 were destroyed and had to be re-established. Comparative readings,





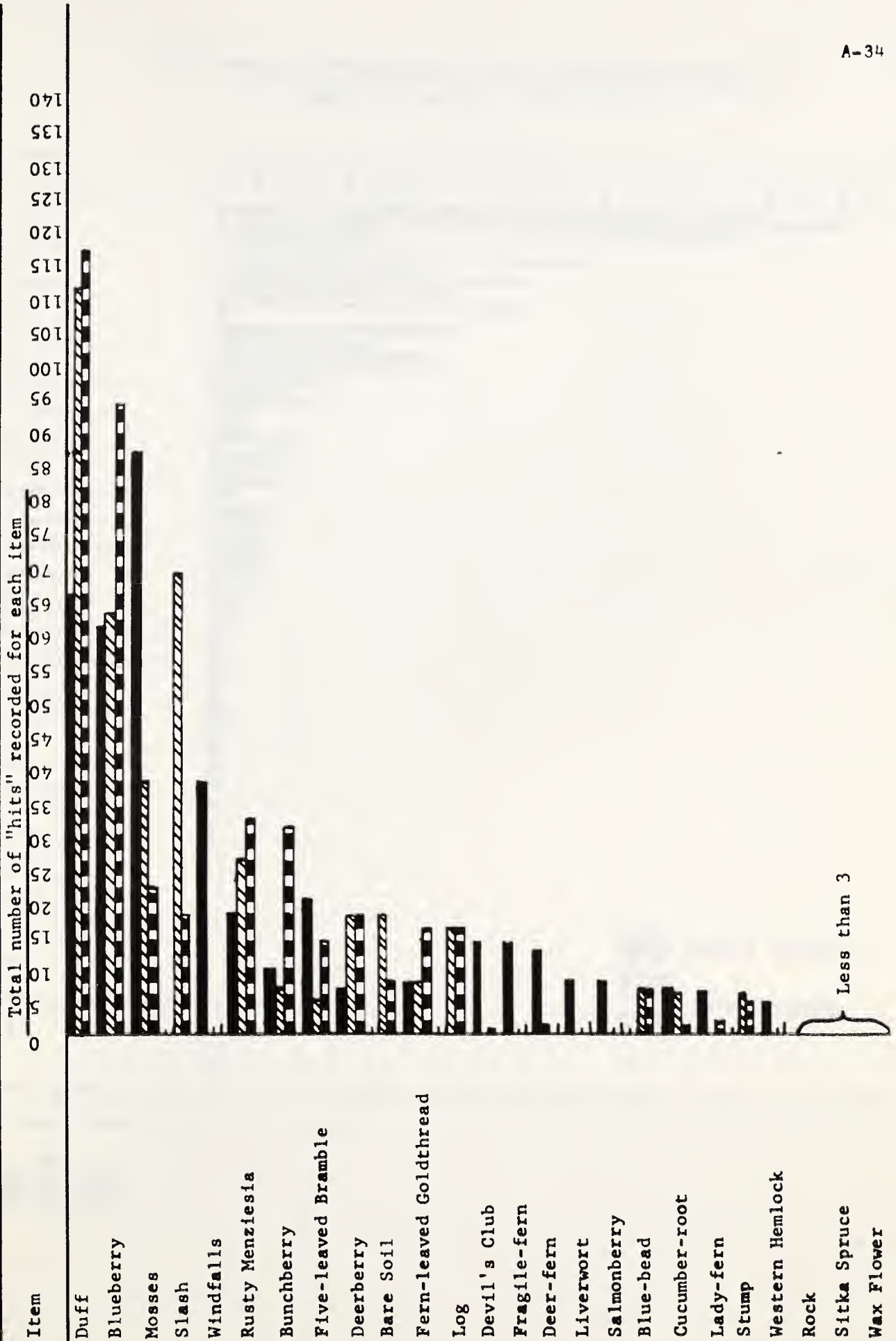
PLOT NO. 8 TRANSECTS 1 - 3 (Deadman Reach-Peril Strait)



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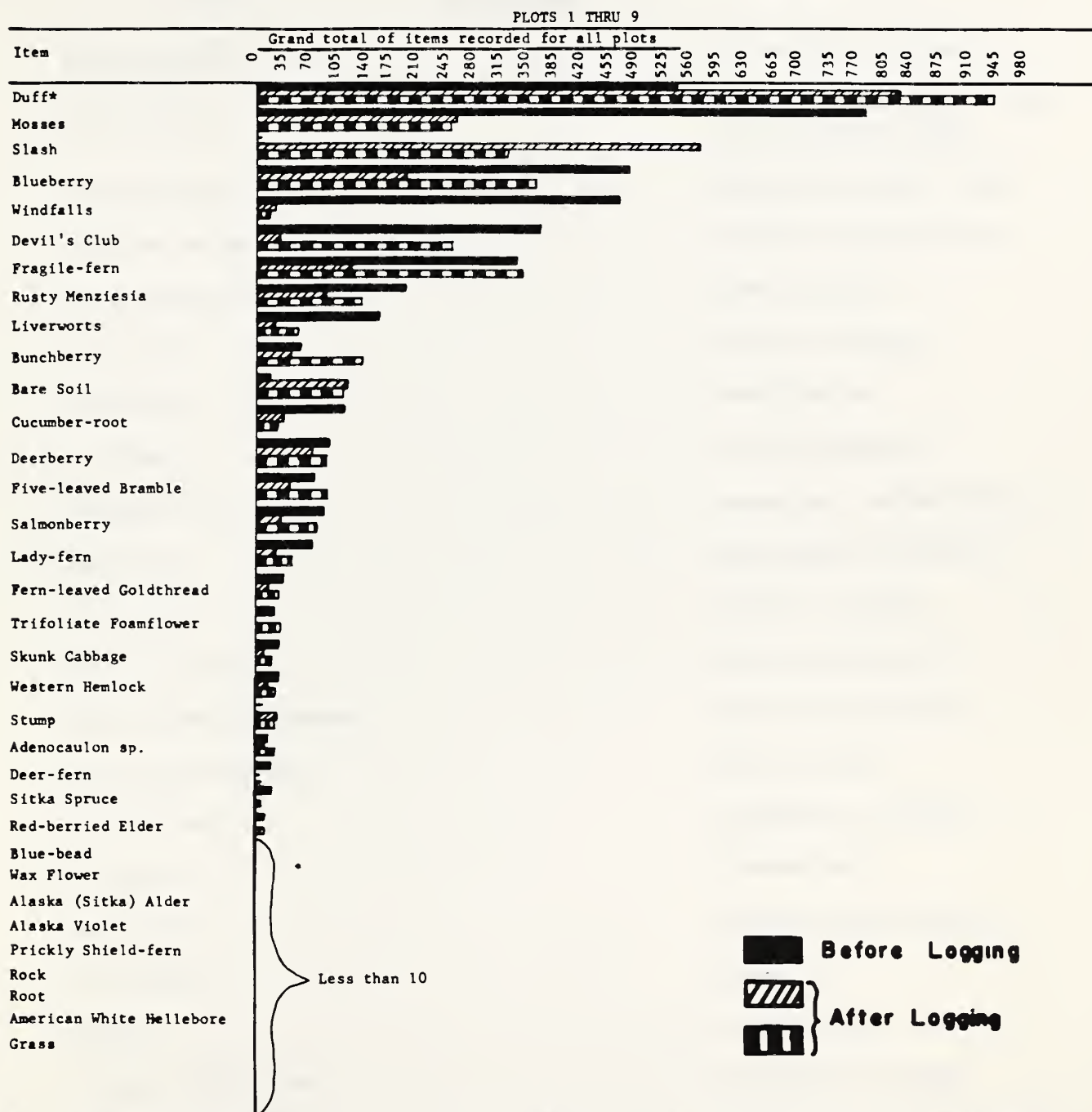


PLOT NO. 9 TRANSECTS 1 - 3 (Saook Bay)





**Fig. 3** - Summary of plants and ground cover types recorded from nine vegetative study plots that were checked prior to logging in 1960 and again after logging in 1961 and 1962. N. Baranof Island.



Note: Readings for 1961 includes only plots affected by logging, whereas, data for 1962 included one unlogged plot.

\* Decaying vegetable matter under 2" in diameter.

**Key**  
 1960 1961 1962





COMMON AND SCIENTIFIC NAMES OF PLANTS MENTIONED IN  
THE REPORT\*

Adenocaulon** sp. . . . .	Adenocaulon bicolor
Alaska Alder. . . . .	Alnus fruticosa Rupr. var. sinauta (Regel) Hult
Alaska Violet . . . . .	Viola langsдорфii fisch.
American White Hellebore. . . . .	Veratrum eschscholtzii
Beach Ryegrass. . . . .	Elymus mollis
Blue-bead . . . . .	Clitonia uniflora
Blueberry . . . . .	Vaccinium sp.
Bunchberry. . . . .	Cornus canadensis
Cucumber-root . . . . .	Streptopus amplexifolius
Deerberry . . . . .	Maianthemum dilitatum
Deer-fern . . . . .	Blechnum spicant
Devil's Club. . . . .	Oplopanax horridus
Fern-leaved Goldthread. . . . .	Coptis asplenifolia
Five-leaved Bramble . . . . .	Rubus pedatus
Fragile-fern. . . . .	Cystopteris fragilis
Grasses . . . . .	Festucoidae
Lady-fern . . . . .	Aythium filix-femina
Liverworts. . . . .	Hepaticae
Mosses. . . . .	Lycopodiaceae
Prickly Shield-fern . . . . .	Polystichum braunii
Red-berried Elder . . . . .	Sambucus racemosa L. subsp. pubens (Michx.) Hult.
Rusty Menziesia . . . . .	Menziesia ferruginea
Salmonberry . . . . .	Rubus spectabilis



Sitka Spruce. . . . .	Picea sitchensis
Skunk Cabbage . . . . .	Lysichitum americanum
Trifoliate Foamflower . . . . .	Tiarella trifoliata
Wax Flower. . . . .	Moneses uniflora
Western Hemlock . . . . .	Tsuga heterophylla

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Manual source for plant nomenclature was obtained from J. P. Anderson's Flora of Alaska (Ames, Iowa: Iowa State Univ. Press, 1959), 543 pp.

\*\*

Lit. source: H. M. Gilkey Handbook of Northwest Flowering Plants (Portland, Oregon: Metropolitan Press, Publishers, 1936), 407 pp.





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## LITERATURE REFERENCES

Erickson, A. W.

1963. Characteristics of the Brown and Grizzly Bear Harvest. Job No. 2. Bear Investigations. Fed. Aid Report in Wildlife Resto. W-6-R-3, Work Plan F. Vol. III. Alaska Dept. of Fish & Game, Juneau, Alaska, 11pp.

---

1963. Report on Bear for 1962-63. Fed. Aid in Wildlife Resto. W-6-R-4, Work Plan F. Vol. IV. Alaska Dept. of Fish & Game, Juneau, Alaska, 32pp.

---

1965. The Brown-Grizzly Bear in Alaska - Its Ecology and Management. Alaska Dept. of Fish & Game, Juneau, Alaska, 42pp.

Klein, D. R.

1958. Southeast Alaska Brown Bear Studies. Job No. 1. Alaska Brown Bear Studies. Fed. Aid in Wildlife Resto. W-3-R-13, Work Plan J, Job No. 1 & 2, Vol. 13, No. 1. U.S. Fish & Wildlife Service, Juneau, Alaska, 21pp.

Lentfer, J. W.

1965. Bear Studies. Fed. Aid in Wildlife Resto. W-6-R-5,6. Work Plan F. Vol. VI. Alaska Dept. of Fish & Game, Juneau, Alaska, 13pp.

Lentfer, J. W., J. R. Blum, S. H. Eide, and L. H. Miller.

1966. Bear Studies. Fed. Aid in Wildlife Resto. W-6-R-6, Work Plan F and W-15-R-1, Work Plan M. Vol. VII. Alaska Dept. of Fish & Game, Juneau, Alaska, 33pp.

Palmer, L. J.

1942. Major Vegetative Types of Southeastern Alaska. U.S. Fish & Wildlife Service, Juneau, Alaska, Unpublished, 15pp.

Perensovich, M. M.

1962. Brown Bear Progress Report 1960-62. U.S. Forest Service, North Tongass National Forest, Juneau, Alaska, 44pp.

---

1964. Brown Bear Studies - Interim Report 1958-63. North Tongass National Forest, Juneau, Alaska, 42pp.

---

1964. Brown Bear Studies, Progress Report - 1964. North Tongass National Forest, 8pp.

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1965. Brown Bear Studies, Progress Report - 1965. North Tongass National Forest, 8pp.

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